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A balancing act: scientists seek to reduce the risk of falls in the elderly

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DOI 10.1109/MPUL.2016.2647059 **PMID** 28328493

Abstract

It was the inaugural day of the study in 2005 when Brad Manor went out into the hot Louisiana sun to meet his first patient, a gentleman we'll call James. Manor, now director of the Mobility and Brain Function Lab at the Harvard-affiliated Institute for Aging Research, was, at that time, a Ph.D. student at Louisiana State University (Figure 1). James, a man in his early 70s, suffered from peripheral neuropathy, a condition that caused significant nerve damage in his legs and feet. James got out of his car, carrying his cane in his hand, and walked with Manor to the lab. It wasn't until they were standing still and talking in the exam room that James leaned on his cane with its tip on the floor to stabilize himself. Manor was surprised. "That's opposite to what we typically think," he remarks, looking back on the incident. "Intuitively, standing seems simpler than walking." But James had much more difficulty standing and was actually quite competent while in motion.

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A multi-component cognitive behavioural intervention for the treatment of fear of falling after hip fracture (FIT-HIP): protocol of a randomised controlled trial

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BMC Geriatr. 2017; 17(1): e71.

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DOI 10.1186/s12877-017-0465-9 **PMID** 28320331

Abstract

BACKGROUND: Hip fracture is a common injury in the geriatric population. Despite surgical repair and subsequent rehabilitation programmes, functional recovery is often limited, particularly in individuals with multi-morbidity. This leads to high care dependency and subsequent use of healthcare services. Fear of falling has a negative influence on recovery after hip fracture, due to avoidance of activity and subsequent restriction in mobility. Although fear of falling is highly prevalent after hip fracture, no structured treatment programme is currently available. This trial will evaluate whether targeted treatment of fear of falling in geriatric rehabilitation after hip fracture using a multi-component cognitive behavioural intervention (FIT-HIP), is feasible and (cost) effective in reducing fear of falling and associated activity restriction and thereby improves physical functioning.

METHODS/DESIGN: This multicentre cluster randomised controlled trial will be conducted among older patients with hip fracture and fear of falling who are admitted to a multidisciplinary inpatient geriatric rehabilitation programme in eleven post-acute geriatric rehabilitation units. Fifteen participants will be recruited from each site. Recruitment sites will be allocated by computer randomisation to either the control group, receiving usual care, or to the intervention group receiving the FIT-HIP intervention in addition to usual care. The FIT-HIP intervention is conducted by

physiotherapists and will be embedded in usual care. It consists of various elements of cognitive behavioural therapy, including guided exposure to feared activities (that are avoided by the participants). Participants and outcome assessors are blinded to group allocation. Follow-up measurements will be performed at 3 and 6 months after discharge from geriatric rehabilitation. (Cost)-effectiveness and feasibility of the intervention will be evaluated. Primary outcome measures are fear of falling and mobility.

DISCUSSION: Targeted treatment of fear of falling may improve recovery and physical and social functioning after hip fracture, thereby offering benefits for patients and reducing healthcare costs. **RESULTS** of this study will provide insight into whether fear of falling is modifiable in the (geriatric) rehabilitation after hip fracture and whether the intervention is feasible. **TRIAL REGISTRATION:** Netherlands Trial Register: NTR 5695.

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A systematic review and meta-analysis of outcome measures to assess postural control in older adults who undertake exergaming

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Maturitas 2017; 98: 35-45.

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Abstract

Exergaming has been shown to be an effective tool to improve postural control (PC) in older community-dwelling individuals. The outcome measures (OMs) used to assess PC are varied and this could limit the estimation of the effectiveness of the intervention. This systematic review and meta-analysis aims to explore the OMs currently used to assess PC in exergaming interventions, for healthy elderly individuals aged over 60 years. The literature search was conducted across five databases (CINAHL, EMBASE, PubMed, ISI, SPORTdiscus and Science Direct) using a range of search terms and combinations relating to exergaming, balance, exercise, falls and elderly. Quality assessment was conducted using the PEDro Scale and a custom-made quality assessment tool. Eleven trials were included in the meta-analysis, with a mean (SD) PEDro score of 5.36 (1.57). Primary and secondary OMs showed small effects in favour of alternative training modes, although these effects were statistically insignificant for all primary OMs. Tertiary OMs could not be included in the meta-analysis due to varying output parameters from different instruments. Heterogeneity remained high across trials and no studies performed long-term follow-up. Exergaming is a potential alternative to PC training, although still in its infancy. Strong and well-designed RCTs are needed, targeting specific populations aged over 60 years. Variability in instrumented OMs prevents generalisation of results. Technological improvements may provide data not currently available from clinical and laboratory-based methods, and may allow PC to be assessed more realistically and specifically in relation to a population's activities of daily living, though this remains a new area of research. Copyright © 2017 Elsevier B.V. All rights reserved.

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An integrated approach to falls prevention: a model for linking clinical and community interventions through the Massachusetts Prevention and Wellness Trust Fund

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DOI 10.3389/fpubh.2017.00038 **PMID** 28321393 **PMCID** PMC5337485

Abstract

Older adult falls continue to be a public health priority across the United States-Massachusetts (MA) being no exception. The MA Prevention and Wellness Trust Fund (PWTF) program within the MA Department of Public Health aims to reduce the physical and economic burdens of chronic health conditions by linking evidence-based clinical care with community intervention programs. The PWTF partnerships that focused on older adult falls prevention integrated the Centers for Disease Control and Prevention's Stopping Elderly Accidents, Death and Injuries toolkit into clinical settings. Partnerships also offer referrals for home safety assessments, Tai Chi, and Matter of Balance programs. This paper describes the PWTF program implementation process involving 49 MA organizations, while highlighting the successes achieved and lessons learned. With the unprecedented expansion of the U.S. Medicare beneficiary population, and the escalating incidence of falls, widespread adoption of effective prevention strategies will become increasingly important for both public health and for controlling healthcare costs. The lessons learned from this PWTF initiative offer insights and recommendations for future falls prevention program development and implementation.

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Clinical definitions of sarcopenia and risk of hospitalization in community-dwelling older men: the Osteoporotic Fractures in Men Study

Cawthon PM, Lui LY, Taylor BC, McCulloch CE, Cauley JA, Lapidus J, Orwoll E, Ensrud KE.

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(Copyright © 2017, Gerontological Society of America)

DOI 10.1093/gerona/glw327 **PMID** 28329087

Abstract

BACKGROUND: The association between various definitions of sarcopenia and hospitalization has not been evaluated in community-dwelling older men.

METHODS: We used data from 1,516 participants at Visit 3 of the Osteoporotic Fractures in Men (MrOS) study who also had linked Medicare Fee-For-Service Claims data available. We examined the association between several sarcopenia definitions (International Working Group, European Working Group for Sarcopenia in Older Persons, Foundation for the NIH Sarcopenia Project, Baumgartner, and Newman) and hospitalization, using two-part models, adjusted for age, clinical center, functional limitations, self-reported health, comorbidity, and cognitive function. Predictors included sarcopenia status (the summary definitions and the components of slowness, weakness, and/or lean mass); outcomes included hospitalization and cumulative inpatient days/year in the 3 years following the Visit 3 exam.

RESULTS: After accounting for confounding factors, none of the summary definitions or the definition components (slowness, weakness, or low lean mass) were associated with likelihood of hospitalization, the rate ratio of inpatient days among those hospitalized, or the mean rate of inpatient days amongst all participants.

CONCLUSIONS: Sarcopenia was not associated hospitalization in community-dwelling older men. These results provide further evidence that current sarcopenia definitions are unlikely to identify those who are most likely to have greater hospitalization.

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Correlation between movement complexity during static standing and balance function in institutionalized older adults

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(Copyright © 2017, Dove Medical Press)

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Abstract

PURPOSE: Sample entropy (SampEn) is an analysis to evaluate movement complexity of the center of pressure (COP). A lower value of SampEn indicates lower complexity of COP variability, that is, rigidity, and lower degrees of freedom. Previous studies reported the association of increased SampEn with improved standing balance ability in young subjects. However, no studies have examined these relationships among older adults. Thus, we aimed to investigate the relationship between SampEn and standing balance ability in older adults.

SUBJECTS AND METHODS: The subjects were 33 institutionalized older adults (aged 82.2 ± 6.5 years). COP during static standing was measured. The standard deviation (SD) values of COP and SampEn in the sagittal and frontal planes were calculated using time series data. One-leg standing test (OLST), functional reach (FR) test, and lateral reach (LR) test were also measured to evaluate standing balance ability.

RESULTS: OLST, FR, and LR were 6.5 ± 8.3 s, 19.8 ± 5.9 cm, and 18.2 ± 6.4 cm, respectively. Pearson correlation analysis revealed that SampEn in the sagittal plane significantly correlated with OLST ($r = -0.35$) and FR ($r = -0.36$). However, SampEn in the frontal plane and SD of COP in both sagittal and frontal planes had no relationship with any of the clinical balance tests.

CONCLUSION: Lower SampEn implies rigidity for postural control. In the present study, it was found that lower SampEn in the sagittal plane was related to a higher balance function, which suggests that older adults utilized body rigidity to maintain postural stability as a compensative strategy.

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Dementia and delirium, the outcomes in elderly hip fracture patients

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Abstract

BACKGROUND: Delirium in hip fractured patients is a frequent complication.

Dementia is an important risk factor for delirium and is common in frail elderly. This study aimed to extend the previous knowledge on risk factors for delirium and the consequences. Special attention was given to patients with dementia and delirium.

METHODS: This is a retrospective cohort study performed in the Amphia Hospital, Breda, the Netherlands. A full electronic patient file system (Hyperspace Version IU4: Epic, Inc., Verona, WI, USA) was used to assess data between January 2014 and September 2015. All patients presented were aged ≥ 70 years with a hip fracture, who underwent surgery with osteosynthesis or arthroplasty. Patients were excluded in case of a pathological or a periprosthetic hip fracture, multiple traumatic injuries, and high-energy trauma. Patient and surgical characteristics were documented. Postoperative outcomes were noted. Delirium was screened using Delirium Observation Screening Scale and dementia was assessed from medical notes.

RESULTS: Of a total of 566 included patients, 75% were females. The median age was 84 years (interquartile range: 9). Delirium was observed in 35%. Significant risk factors for delirium were a high American Society of Anesthesiology score, delirium in medical history, functional dependency, preoperative institutionalization, low hemoglobin level, and high amount of blood transfusion. Delirium was correlated with a longer hospital stay ($P=0.001$), increased association with complications ($P<0.001$), institutionalization ($P<0.001$), and 6-month mortality ($P<0.001$). Patients with dementia ($N=168$) had a higher delirium rate (57.7%, $P<0.001$) but a shorter hospital stay ($P<0.001$). There was no significant difference in the 6-month mortality between delirious patients with (34.0%) and without dementia (26.3%).

CONCLUSION: Elderly patients with a hip fracture are vulnerable for delirium, especially when the patient has dementia. Patients who underwent an episode of delirium were at increased risk for adverse outcomes.

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Design and evaluation of vibratory shoe on balance control for elderly subjects: technical note

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Disabil. Rehabil. Assist. Technol. 2017; ePub(ePub): ePub.

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DOI 10.1080/17483107.2017.1300346 **PMID** 28326869

Abstract

BACKGROUND AND AIM: Aging often results in a decline in somatosensory function, and such changes are associated with diminished motor performance. Input noise can enhance sensory and motor function through a mechanism known as stochastic resonance (SR). This paper describes the development and testing of a new vibrating shoe to possibly assist the elderly patients in controlling their balance and decreasing their falling risks.

TECHNIQUE: The new vibrating shoe was evaluated to ascertain its ability to generate appropriate random and nonlinear vibrations. The vibratory shoe performance in two young subjects with decreased foot sensation and two elderly subjects in different static and dynamic balance situations was also evaluated. The postural control, expressed by the stability index (SI), was significantly affected by SR in the older subjects.

DISCUSSION: The vibrating motors could be recommended as a suitable solution for dynamic balance situations. Moreover, the new vibrating shoe could improve the age-related balance impairments in elderly subjects with balance deficiencies and others with impaired foot sensations. Implications for rehabilitations Older adults exhibited decreased postural stability. Noise signal improves sensation and proprioception in older people. New shoe with vibrating motors can operate in different dynamic situations.

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Identifying predictive motor factors for falls in post-menopausal breast cancer survivors

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PLoS One 2017; 12(3): e0173970.

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(Copyright © 2017, Public Library of Science)

DOI 10.1371/journal.pone.0173970 **PMID** 28306736

Abstract

OBJECTIVE: Breast cancer treatment, including radical surgery, is also pursued as late as the 7th - 8th decade of women's lives. Standard physical rehabilitation procedures offered to those women are predominantly focused on attenuating specific functional deficits of the upper limb and trunk. Seldom do they entail any regimens specifically aimed at recovering overall functionality, and reducing exposure to falls-risk. The study aimed to assess potential interrelationships between the self-reported falls, individual functional capabilities and appreciably reducing exposure to falls-risk in a group of post-menopausal, post-surgical breast cancer survivors.

METHODS: The study recruited 102 women (aged 65-79; mean age 70.2), post-surgical breast cancer survivors. The subjects were stratified by age into three groups: Group 1 (65-69 years); Group 2 (70-74 years), and Group 3 (75-79 years). Individual functional capabilities were assessed with Eight-foot up & go test (8UG), chair stand test (CST), and 2-minute step test (2ST). Tinetti POMA test was applied to assess gait and balance disorders. Self-reported falls in the past year were ascertained through a questionnaire.

RESULTS: Assessment of individual aerobic endurance (2ST) also demonstrated a clear deficit in the mean scores category in all respective age sub-groups, as compared against the reference values. The deficits ranged from 4.86 to 15.90 steps less than the normative values; the oldest subjects demonstrating the largest deficit. The aerobic endurance tests results significantly impacted the ultimate assessment of an individual falls-risk in the oldest group. The analysis of the number of falls sustained within the recent year indicated that 43.67% of the subjects fell victim of such incidents.

CONCLUSION: An individual exposure to falls-risk was found to be appreciably more dependent upon individual aerobic endurance rather than overall strength of the lower part of the body in the breast cancer survivors over 75.

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Neck of femur fractures in the elderly: does every hour to surgery count?

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Injury 2017; ePub(ePub): ePub.

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(Copyright © 2017, Elsevier Publishing)

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Abstract

OBJECTIVES: To determine if early surgery before 12h confers a survival or length of stay benefit for patients with neck of femur (NOF) fractures.

DESIGN: Retrospective review of prospectively collected data.

SETTING: District general hospital.

PATIENTS: 1913 patients aged over 60 admitted with a fractured NOF who underwent surgery between 2011 and 2015. Mean age was 83.9 years. 73.7% were female.

INTERVENTION: Patients had surgery for fractured NOF with data collected on demographics, mortality and length of stay.

MAIN OUTCOME MEASUREMENTS: Data collected included gender, age, ASA grade, fracture anatomy, surgery, time to surgery, days spent in acute hospital and rehabilitation settings and 30-day mortality. Statistical analysis was used to identify independent predictors of mortality and length of stay.

RESULTS: 30-day mortality was 6.1% and the mean hospitalisation time was 13±11.3days for the acute hospital and 20.2±17.2days for the trust. Operations were performed at a mean of 23.8±14.8h after presentation. Age, gender, ASA grade and type of fracture were independent predictors of either mortality or length of stay. Timing of surgery had an association with mortality but this only reached statistical significance at 24h. In line with previous studies we analysed time to surgery in 12h blocks. We also used logistic regression, recognizing time as a continuous variable, which revealed that every hour of delay to surgery increased the mortality risk by 1.8%.

CONCLUSIONS: While every hour of delay increased mortality risk, the association with mortality only became statistically significant when delaying over 24h. This supports a pragmatic approach, with surgery as soon as medically possible without a race to theatre. **LEVEL OF EVIDENCE:** Level III retrospective cohort study. Copyright © 2017 Elsevier Ltd. All rights reserved.

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Paramedic assessment of older adults after falls, including community care referral pathway: cluster randomized trial

Snooks HA, Anthony R, Chatters R, Dale J, Fothergill RT, Gaze S, Halter M, Humphreys I, Konioutou M, Logan P, Lyons RA, Mason S, Nicholl J, Peconi J, Phillips C, Porter A, Siriwardena AN, Wani M, Watkins A, Wilson L, Russell IT.

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(Copyright © 2017, American College of Emergency Physicians, Publisher Elsevier Publishing)

DOI 10.1016/j.annemergmed.2017.01.006 PMID 28302422

Abstract

STUDY OBJECTIVE: We aim to determine clinical and cost-effectiveness of a paramedic protocol for the care of older people who fall.

METHODS: We undertook a cluster randomized trial in 3 UK ambulance services between March 2011 and June 2012. We included patients aged 65 years or older after an emergency call for a fall, attended by paramedics based at trial stations. Intervention paramedics could refer the patient to a community-based falls service instead of transporting the patient to the emergency department. Control paramedics provided care as usual. The primary outcome was subsequent emergency contacts or death.

RESULTS: One hundred five paramedics based at 14 intervention stations attended 3,073 eligible patients; 110 paramedics based at 11 control stations attended 2,841 eligible patients. We analyzed primary outcomes for 2,391 intervention and 2,264 control patients. One third of patients made further emergency contacts or died within 1 month, and two thirds within 6 months, with no difference between groups. Subsequent 999 call rates within 6 months were lower in the intervention arm (0.0125 versus 0.0172; adjusted difference -0.0045; 95% confidence interval -0.0073 to -0.0017). Intervention paramedics referred 8% of patients (204/2,420) to falls services and left fewer patients at the scene without any ongoing care. Intervention patients reported higher satisfaction with interpersonal aspects of care. There were no other differences between groups. Mean intervention cost was \$23 per patient, with no difference in overall resource use between groups at 1 or 6 months.

CONCLUSION: A clinical protocol for paramedics reduced emergency ambulance calls for patients attended for a fall safely and at modest cost.

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Racial-ethnic differences in fall prevalence among older women: a cross-sectional survey study

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BMC Geriatr. 2017; 17(1): e65.

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DOI 10.1186/s12877-017-0447-y **PMID** 28284206

Abstract

BACKGROUND: Falls are the leading cause of hip fracture in older women, with important public health implications. Fall risk increases with age and other clinical factors, and varies by race/ethnicity. International studies suggest that fall risk is lower in Asians, although data are limited in U.S.

POPULATIONS: This study examines racial/ethnic differences in fall prevalence among older U.S. women within a large integrated healthcare delivery system.

METHODS: This cross-sectional study used data from 6277 women ages 65-90 who responded to the 2008 or 2011 Kaiser Permanente Northern California Member Health Survey (KPNC-MHS). The KPNC-MHS is a mailed questionnaire sent to a random sample of adult members stratified by age, gender, and geographic location, representing a population estimate of >200,000 women age ≥65 years. Age, race/ethnicity, self-reported health status, presence of diabetes, arthritis or prior stroke, mobility limitations and number of falls in the past year were obtained from the KPNC-MHS. The independent association of race/ethnicity and recent falls was examined, adjusting for known risk factors.

RESULTS: The weighted sample was 76.7% non-Hispanic white, 6.2% Hispanic, 6.8% black and 10.3% Asian. Over 20% reported having fallen during the past year (28.5% non-Hispanic white, 27.8% Hispanic, 23.4% black and 20.1% Asian). Older age was associated with greater fall risk, as was having diabetes (OR 1.24, CI 1.03-1.48), prior stroke (OR 1.51, CI 1.09-2.07), arthritis (OR 1.61, CI 1.39-1.85) and mobility limitations (OR 2.82, CI 2.34-3.39), adjusted for age. Compared to whites, Asian (OR 0.64, CI 0.50-0.81) and black (OR 0.73, CI 0.55-0.95) women were much less likely to have ≥1 fall in the past year, adjusting for age, comorbidities, mobility limitation and poor health status. Asians were also less likely to have ≥2 falls (OR 0.62, CI 0.43-0.88).

CONCLUSIONS: Among older women, the risk of having a recent fall was substantially lower for black and Asian women when compared to white women. This may contribute to their lower rates of hip fracture. Future studies should examine cultural and behavioral factors that contribute to these observed racial/ethnic differences in fall risk among U.S. women.

PDF Y Endnote Y

Reducing falls in a care home

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Affiliation: NHS Grampian, Aberdeen Health & Social Care Partnership.

(Copyright © 2017, BMJ Publishing Group)

DOI 10.1136/bmjquality.u214186.w5626 **PMID** 28321298 **PMCID** PMC5337710

Abstract

Care home residents are 3 times more likely to fall than their community dwelling peers and 10 times more likely to sustain a significant injury as a result. 2 A project commenced at a care home in Aberdeen with the aim of reducing the number of falls by 20% by 30st April 2016 using the model for improvement. Qualitative data was gathered to establish staff belief about falls and their level of knowledge& understanding about falls risks and how to manage these. This informed the training which was delivered and iterative testing commenced with the introduction of the Lanarkshire Falls Risk/Intervention tool - where the multifactorial nature of a resident's falls risks are explored and specific actions to manage these are identified and implemented. Failure to meet PDSA predictions about sharing risk reducing actions with staff and length of time to complete the tool prompted a focus on communication and the processes whereby the tool is completed. "Teach back" was employed to highlight communication difficulties and ultimately the introduction of Huddles out improved the flow of information about residents and informed the Falls Risk/Intervention tool. 5 PDSAs were completed and within them multiple tests of change. The improvement shift came following a root cause analysis of the nature & cause of one resident's falls and applying the tool & communication processes. The average falls rate fell from 49 per 1000 occupied bed days to 23.6 and was sustained because of the attention to the importance of communication. The aim was achieved with a 36.6% reduction in Falls rate.

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Remote traumatic brain injury is associated with motor dysfunction in older military veterans

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J. Gerontol. A Biol. Sci. Med. Sci. 2017; ePub(ePub): ePub.

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(Copyright © 2017, Gerontological Society of America)

DOI 10.1093/gerona/glw341 **PMID** 28329183

Abstract

BACKGROUND: Traumatic brain injury (TBI) has been identified as a risk factor for Parkinson's disease (PD). Motor dysfunction among TBI-exposed elders without PD has not been well characterized. We sought to determine whether remote TBI is a risk factor for motor dysfunction on exam and functionally relevant motor dysfunction in day-to-day life among independently living elders without PD.

METHODS: This is a cross-sectional cohort study of independently living retired military veterans

aged 50 or older with (n = 78) and without (n = 85) prior TBI-all without diagnosed PD. To characterize multidimensional aspects of motor function on exam, the Unified Parkinson's Disease Rating Scale (UPDRS) Motor Examination was performed by a board-certified neurologist and used to calculate a modified UPDRS (mUPDRS) global motor score and four domain scores (tremor, rigidity, bradykinesia, and posture/gait). Functionally relevant motor dysfunction was assessed via self-report of falls within the past year.

RESULTS: In analyses adjusted for demographics and comorbidities that differed between groups, compared with veterans without TBI, those with moderate-to-severe TBI were more likely to have fallen in past year (33% vs. 14%, risk ratio 2.5 [95% confidence interval 1.1-5.4]), had higher (worse) mUPDRS global motor (p =.03) and posture/gait scores (p =.02), but not higher tremor (p =.70), rigidity (p =.21), or bradykinesia scores (p =.22). Mild TBI was not associated with worse motor function.

CONCLUSIONS: Remote moderate-to-severe TBI is a risk factor for motor dysfunction-defined as recent falls and impaired posture/gait-among older veterans. TBI-exposed older adults may be ideal candidates for aggressive fall-screening and prevention strategies.

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RESPOND: a programme to prevent secondary falls in older people presenting to the emergency department with a fall: protocol for an economic evaluation

Morello RT, Morris RL, Hill KD, Haines TP, Arendts G, Redfern J, Etherton-Bear CD, Lowthian JA, Brand CA, Liew D, Watts JJ, Barker AL.

Inj. Prev. 2017; 23(2): 124-130.

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(Copyright © 2017, BMJ Publishing Group)

DOI 10.1136/injuryprev-2016-042169 **PMID** 28330932

Abstract

BACKGROUND: Falls remain common for community-dwelling older people and impose a substantial economic burden to the healthcare system. RESPOND is a novel falls prevention programme that aims to reduce secondary falls and fall injuries among older people who present to a hospital emergency department (ED) with a fall. The present protocol describes a prospective economic evaluation examining the incremental cost-effectiveness of the RESPOND programme, compared with usual care practice, from the Australian health system perspective.

METHODS AND DESIGN: This economic evaluation will recruit 528 participants from two major tertiary hospital EDs in Australia and will be undertaken alongside a multisite randomised controlled trial. Outcome and costing data will be collected for all participants over the 12-month trial. It will compare the RESPOND falls prevention programme with usual care practice (current community-based falls prevention practices) to determine its incremental cost-effectiveness according to three intermediate clinical outcomes: (1) falls prevented, (2) fall injuries prevented and (3) injurious falls prevented. In addition, utilities will be derived from a generic quality-of-life measure (EQ-5D-5L) and used to calculate the 'incremental cost per quality-adjusted life years gained'.

DISCUSSION: The results of this study will provide healthcare decision makers with evidence to assist with setting spending thresholds for preventive health programmes and inform selection of emergency and community service models of care. **TRIAL REGISTRATION NUMBER:** The protocol for



this study is registered with the Australian New Zealand Clinical Trials Registry
(ACTRN12614000336684)

PDF Y Endnote Y

The relationship between cumulative lifetime ultraviolet radiation exposure, bone mineral density, falls risk and fractures in older adults

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Osteoporos. Int. 2017; ePub(ePub): ePub.

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DOI 10.1007/s00198-017-4001-8 **PMID** 28321507

Abstract

Data linking cumulative lifetime vitamin D status with skeletal outcomes are lacking. We show that increasing cumulative sun exposure was associated with higher bone mineral density in younger males and protective against fractures in females independent of current vitamin D. This supports the concept that cumulative sun exposure is an important contributor to skeletal health.

INTRODUCTION: While low 25-hydroxyvitamin D levels are associated with increased fracture risk, this reflects only recent sun exposure. The Beagley-Gibson (BG) method utilises microtopographical skin changes to quantify cumulative lifetime ultraviolet radiation (sun) exposure. This study aimed to describe the relationship between BG grade, BMD, falls risk and fractures in older adults.

METHODS: Eight hundred thirty-five community-dwelling adults aged 53-83 years had silicone casts from the dorsum of both hands graded by the BG method. BMD was measured using DXA and falls risk using the short form of the Physiological Profile Assessment. Vertebral deformities and symptomatic fractures were assessed by DXA and questionnaire, respectively.

RESULTS: The relationship between BG grade, spine BMD and vertebral fracture varied depending upon sex. In females, increasing grade was associated with lower vertebral fracture prevalence (OR = 0.44/grade, $p = 0.018$) and fewer fractures (OR = 0.82/grade, $p = 0.021$), particularly major fractures (OR = 0.75/grade, $p = 0.03$). In males, increasing grade was associated with more DXA-detected vertebral deformities (RR = 1.28/grade, $p = 0.001$), but not symptomatic fractures. These relationships were independent of BMD, falls risk, smoking and current 25-hydroxyvitamin D. BG grade was not associated with falls risk. For BMD, there were interactions between BG grade and both age and sex and a positive trend with hip BMD in younger males.

CONCLUSIONS: BG grade demonstrated beneficial associations with fracture outcomes in females and BMD in younger males independent of current 25-hydroxyvitamin D. These data support the concept that cumulative ultraviolet radiation exposure is an important determinant of skeletal health. The association with vertebral deformities in males may reflect outdoor physical trauma in younger life.

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Walking football as sustainable exercise for older adults - a pilot investigation

Reddy P, Dias I, Holland C, Campbell N, Nagar I, Connolly L, Krusturup P, Hubball H.

Eur. J. Sport Sci. 2017; ePub(ePub): 1-8.

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Abstract

The health benefits of playing football and the importance of exercise and social contact for healthy ageing are well established, but few older adults in the UK take enough exercise. Football is popular, flexible in format and draws players into engrossing, effortful and social exercise, but the physical demands of play at full speed may make it unsustainable for some older adults. Restricted to walking pace, will play still be engaging? Will health benefits be retained? Will physical demands remain manageable? This pilot study aims to investigate: (1) the experience of older adults playing walking football every week, is it sustainable and rewarding, (2) the intensity and locomotor pattern of walking football, (3) the scale and nature of walking football health benefits and (4) possible cognitive benefits of playing walking football through measures of processing speed, selective and divided attention and updating and inhibition components of executive function. 'Walking football' and 'waiting list' groups were compared before and after 12 weeks of one-hour per week football. Walking football was found to be engaging, sustainable for older adults and moderately intensive; however, selective health and cognitive benefits were not found from this brief intervention.

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What doesn't kill you doesn't make you stronger: the long-term consequences of nonfatal injury for older adults

Xu D, Drew JA.

Gerontologist 2017; ePub(ePub): ePub.

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(Copyright © 2017, Oxford University Press)

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Abstract

PURPOSE: The majority of research efforts centering on injury among older adults focus on fall-related injuries and short-term consequences of injury. Little is known about the long-term consequences of all-cause nonfatal injuries, including minor injuries. Using a recent, large, and nationally representative sample of the U.S. non-institutionalized civilian population, the current study examines whether older adults who sustained a nonfatal injury (serious and minor) have higher risk of long-term morbidity and mortality outcomes compared with noninjured seniors.

METHODS: Linked National Health Interview Survey-Medical Expenditure Panel Survey (NHIS-MEPS) data were used to fit logistic and 2-part models to estimate associations between injury incidence and later injury, hospitalization incidence, and length of hospital stay during the 2.5 years following the NHIS interview among 16,109 older adults. Data from the linked National Health Interview Survey-National Death Index (NHIS-NDI) files were used to estimate a Cox proportional hazards model to examine the association between injury incidence and mortality for up to 11 years after the initial interview among 79,504 older adults.

RESULTS: Relative to no injury, serious nonfatal injury was significantly associated with increased risk of another injury, hospitalization, and mortality. Minor injuries were significantly related to higher risk of later injury and mortality.

IMPLICATIONS: Because even minor injuries are strongly associated with increased risks of later injury and mortality, preventing injury among seniors may be an effective way to improve quality of



life and reduce declines in functional capacity.

PDF Y Endnote Y

Identifying fallers among ophthalmic patients using classification tree methodology.

Melillo P, Orrico A, Chirico F, Pecchia L, Rossi S, Testa F, Simonelli F.

PLoS One 2017; 12(3): e0174083.

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Abstract

PURPOSE: To develop and validate a tool aiming to support ophthalmologists in identifying, during routine ophthalmologic visits, patients at higher risk of falling in the following year.

METHODS: A group of 141 subjects (age: 73.2 ± 11.4 years), recruited at our Eye Clinic, underwent a baseline ophthalmic examination and a standardized questionnaire, including lifestyles, general health, social engagement and eyesight problems. Moreover, visual disability was assessed by the Activity of Daily Vision Scale (ADVS). The subjects were followed up for 12 months in order to record prospective falls. A subject who reported at least one fall within one year from the baseline assessment was considered as faller, otherwise as non-faller. Different tree-based algorithms (i.e., C4.5, AdaBoost and Random Forests) were used to develop automatic classifiers and their performances were evaluated by the cross-validation approach.

RESULTS: Over the follow-up, 25 falls were referred by 13 patients. The logistic regression analysis showed the following variables as significant predictors of prospective falls: pseudophakia and use of prescribed eyeglasses as protective factors, recent worsening of visual acuity as risk factor. Random Forest ranked best corrected visual acuity, number of sleeping hours and job type as the most important features. Finally, AdaBoost enabled the identification of subjects at higher risk of falling in the following 12 months with a sensitivity rate of 69.2% and a specificity rate of 76.6%.

CONCLUSIONS: The current study proposes a novel method, based on classification trees applied to self-reported factors and health information assessed by a standardized questionnaire during ophthalmological visits, to identify ophthalmic patients at higher risk of falling in the following 12 months. The findings of the current study pave the way to the validation of the proposed novel tool for fall risk screening on a larger cohort of patients with visual impairment referred to eye clinics.

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Medium doses of vitamin D decrease falls and higher doses of daily vitamin D3 increase falls: a randomized clinical trial

Smith LM, Christopher GJ, Corinna S.

J. Steroid Biochem. Mol. Biol. 2017; ePub(ePub): ePub.

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Abstract

Falls are a serious health problem in the aging population. Because low levels of vitamin D have been associated with increased fall rates, many trials have been performed with vitamin D; two meta-analyses showed either a small effect or no effect of vitamin D on falls. We conducted a study of the

effect of vitamin D on serum 25 hydroxyvitamin D (25OHD) and data on falls was collected as a secondary outcome. In a 12-month double blind randomized placebo trial, elderly women, mean age 66 years, were randomized to one of seven daily oral doses of vitamin D or placebo. The main inclusion criterion for study was a baseline serum 25OHD < 20ng/ml (50nmol/L). A history of falls was collected at baseline and fall events were collected every 3 months. RESULTS showed that the effect of vitamin D on falls followed a U-shaped curve whether analyzed by dose or serum 25OHD levels. There was no decrease in falls on low vitamin D doses 400, 800 IU, a significant decrease on medium doses 1600, 2400, 3200 IU ($p=0.020$) and no decrease on high doses 4000, 4800 IU compared to placebo ($p=0.55$). When compared to 12-month serum 25OHD quintiles, the faller rate was 60% in the lowest quintile < 25ng/ml (< 50nmol/L), 21% in the low middle quintile 32-38ng/ml (80-95nmol/L), 72% in the high middle quintile 38-46ng/ml (95-115nmol/L) and 45% in the highest quintile 46-66ng/ml (115-165nmol/L). In the subgroup with a fall history, fall rates were 68% on low dose, 27% on medium doses and 100% on higher doses. Fall rates on high doses were increased compared to medium doses (Odds Ratio 5.6.95% CI: 2.1-14.8). In summary, the maximum decrease in falls corresponds to a 12-month serum 25OHD of 32-38ng/ml (80-95nmol/L) and faller rates increase as serum 25OHD exceed 40-45ng/ml (100-112.5nmol/L). The Tolerable upper limit (TUL) recently increased in 2010 from 2000 to 4000 IU/day may need to be reduced in elderly women especially in those with a fall history.

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Validation of static and dynamic balance assessment using Microsoft Kinect for young and elderly populations

Eltoukhy M, Kuenze C, Oh J, Signorile J.

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(Copyright © 2017, Institute of Electrical and Electronics Engineers)

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Abstract

Reduction in balance is an indicator of fall risk, and therefore, an accurate and cost effective balance assessment tool is essential for prescribing effective postural control strategies. This study established the validity of the Kinect v2 sensor in assessing center of mass (CoM) excursion and velocity during single leg balance and voluntary ankle sway tasks among young and elderly subjects. We compared balance outcome measures (anteroposterior (AP) and mediolateral (ML) CoM excursion and velocity and average sway length) to a traditional three-dimensional motion analysis system. Twenty subjects (10 young: age = 20.5 ± 2.3 y, height = 171.8 ± 7.2 cm, weight = 70.7 ± 11.6 kg; 10 elderly: age = 70.6 ± 9.5 y, height = 169.1 ± 8.7 cm, weight = 74.0 ± 17.8 kg), with no history of lower extremity injury, participated in this study. Subjects performed six randomized trials; four single leg stand (SLS) and two ankle sway trials. SLS and voluntary ankle sway trials showed that consistency (ICC(2,k)) and agreement (ICC(3,k)) for all variables when all subjects were considered, as well as when the elderly and young groups were analyzed separately. Concordance between systems ranged from poor to nearly perfect depending on the group, task, and variable assessed.

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